THE CARRIER

January 2001 www.mdarc.org www.pacificon.org

January Meeting
Friday January 19
7:30 PM

To Be Announced

Listen to the Thursday Net for Details

Our Savior's Lutheran Church
1035 Carol Lane
Lafayette CA

What's inside

Weekly Nets

Monday	8:00 PM	SATERN Net Salvation Army	147.06
Tuesday	7:30 PM	APRS	147.06 *
Thursday	7:30 PM	Mt. Diablo Amateur Radio Club	147.06

*Planned

President's Message

I hope our MDARC members had a safe and happy holiday season. As you may know a few of our members became silent keys recently and a few have been struck by serious illness. We wish a quick recovery to those members fighting for recovery.

As your new president, despite countless "chads" stuffing our ballot box, I encourage you to get more involved, if you haven't been for a while. This club is so active in many areas that we are consistently thought of by the ARRL as one of the premier clubs in the West. But there is much more fun to be had if we could do a few more key activities. Here is a short list of some goals I would ask you to consider. Get involved in talking on the club 2 meter repeater. We pay a lot of rent to be on possibly the farthest reaching repeater in the entire country. The top of Mt. Diablo sees more land mass than any other point in the U.S. I know that HF is probably more fun due to the much farther distances vs. 2 meter. However, it is also important to keep 2 meter in use for reasons of which I'm sure you are aware.

Next is a critical issue facing the amateur community. You are all aware that the average age of a ham in the country is going up. This is because there are not enough young new hams to offset the WW II generation. I ask you to go out of your way to get a young person, under 40!!, interested in amateur radio. It might be you neighbor, a son or daughter, grandson or granddaughter. This could open the door to them into what YOU have been having so much fun with over the years. It also is crucial in keeping our allotment of bands and frequency protected. There is a very real threat by large commercial interests that would pay huge bucks to take over some of our frequency. We need to use all our allotment in order to constantly justify why we should keep these areas. Your stories about how you served the community through your radio would be welcome by the Carrier editor.

May you all have a healthy, safe and satisfying 2001.

73, Terry, President, KE6WRE

From the membership chair:

Renewals are out. Please return them to the club PO box by 31 Jan 01 to be included in the 2001 MDARC Directory. Also, postage rates increase on 7 Jan 01, so it is better to get your renewal in early and avoid the hassle of having to find a one cent stamp.
73, Sam"

Editor's Column

I would like to thank Wayne Merryman for his help in getting me started. Please send articles for the Carrier to grestep@home.com. The deadline dates are on the final page of the Carrier.

Greg R. Estep, Carrier Editor

From NASA web site...

Since its first flight in 1983, ham radio has flown on more than two dozen space shuttle missions. Dozens of astronauts have used the "Space Shuttle Amateur Radio Experiment", or SAREX, to talk to thousands of kids in school and to their families on Earth while they were in orbit. They have pioneered space radio experimentation, including television and text messaging as well as voice communication. The Russians have had a similar program for the cosmonauts aboard the Russian Space Station MIR. When US astronauts were aboard MIR in preparation for the long duration missions of the ISS, they used amateur radio for communication, including emergency messaging while MIR was in distress. NASA and the Russian space organization called "Energia" have signed agreements that spell out the place of amateur radio on the ISS. A technical team, called the ISS Ham, has been officially established to serve as the interface to support hardware development, crew training and on-orbit operations. More than 40 missions over five years will be required to assemble the ISS in orbit. The sponsoring agencies have stated that they consider access to a ham radio system a requirement for psychological support of the crews, by providing family and general contacts for people who will be in space many weeks at a time.

To read the complete article go to: spaceflight.nasa.gov/station.

W6CX awards

W6CX Awards for 2000
Here are the ones that were announced at the Holiday Party

Harry Styron K6HS
Marie Lewis KF6GLV

Ham of the Year
John Schulze KR6CR

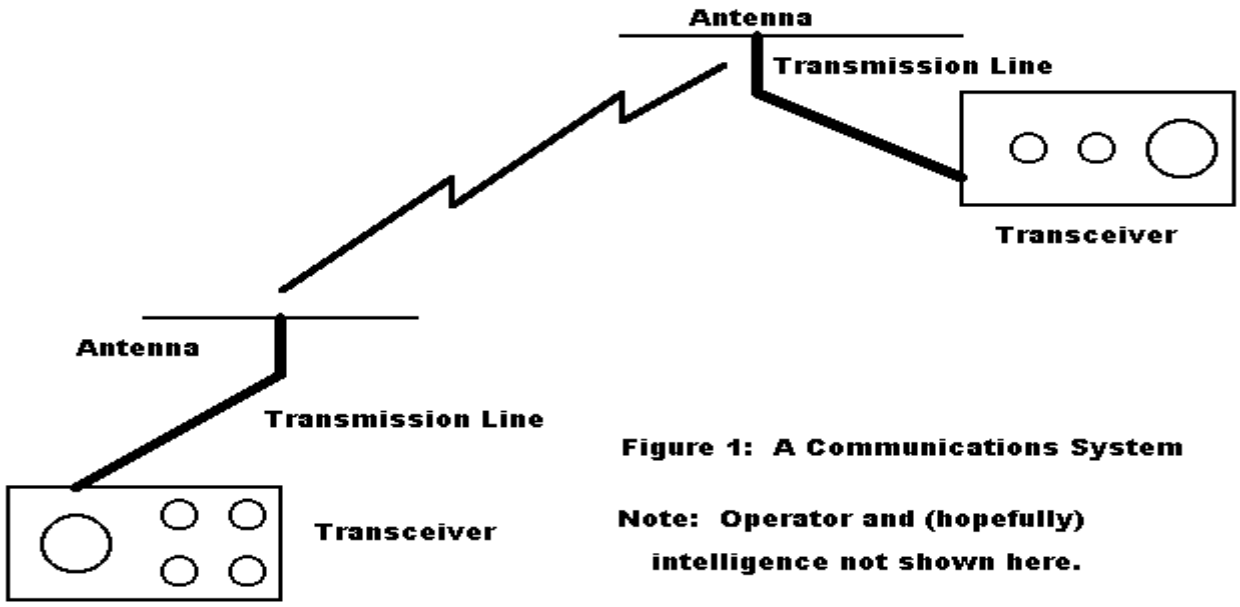
Kilroy Key
Howard Burk KE6PTT

Other awards will be given out at the General Meetings. Be sure to attend to congratulate these people that help the club in so many ways.

Where Do Antennas Fit in Your Communications System?

L. B. Cebik, W4RNL

We can all buy or build a box full of parts called a radio, or a transceiver, if we want to be precise. Then we add
accessories: headphones, keyers, paddles, computers, antennas.
Antennas? Unfortunately, feedlines and antennas are too often looked at as accessories, as if the "rig" was the most important thing in the world in a communications system. And that has blocked our attention to and understanding of antennas. So let's start all over again by looking at a communications system.



no communications will occur. Each station receives and transmits. Each needs devices to receive and to transmit. What transmitting and receiving have in common--usually, but not absolutely always--is a transmission line and antenna. For some special purposes, like working 160 meters, some folks use separate receiving and transmitting antennas, and separate feedlines. Although this may seem very basic, let's review the functions of these components of the communications system:
Transmitter: a collection of circuits (composed of components) that generates RF electrical energy and modifies it to include intelligence.
Receiver: a collection of circuits (composed of components) that separates the intelligence from the incoming RF electrical energy for station use.
Transmission line: transfers RF electrical energy from the transmitter to the antenna with minimal loss. Also transfers RF electrical energy from the antenna to the receive with minimal loss. Required only when the antenna is remote from the transmitter.
Antenna: a transducer that converts RF electrical energy into electro- magnetic radiation or fields and which converts intercepted electro- magnetic radiation into RF electrical energy.
Interestingly, if we connect the transmitter and receiver directly to the antenna, as we virtually do with VHF handhelds (walkie-talkies?), we can eliminate the most interesting part of the communications system: the transmission line. Transmission lines are not interesting just because they seem mysterious. They are especially interesting because they are the key to everything else. Some traditional treatments of communications electronics begin with transmission line theory. From there, they derive lumped components (capacitors and inductors) and then they also derive antennas.
Notice that I said "lumped components (capacitors and inductors)." I did not say "capacitance and inductance. One of the things we have to do to understand antennas and transmission lines is to separate in our minds the ideas of things--the capacitors and inductors--from the basic phenomena-- capacitance and inductance. Capacitors and inductors are just the things we use to implement controlled amounts of capacitance and inductance when and where we want them.

Transmission lines also exhibit capacitance and inductance. Every length of wire exhibits inductance, and every pair of surfaces (like wire surfaces) exhibit capacitance. Although transmission lines come in many varieties ranging from one wire to many, the two wire line--coax or parallel--is most familiar to us. Two wires with a finite length equals capacitance and inductance.

Transmission lines have something else of note: standing waves. A standing wave is nothing more than the variations in voltage and current along a transmission line. When measured and plotted on a graph, they replicate an electrical wave as we are accustomed to picturing it: something more or less like a sine wave with many possible variations.

Standing waves are functions of basic electrical properties: If we pass a current through a wire, it generates an electro-magnetic field. If the electrical energy is alternating current (AC) and high enough in frequency (RF), then that field will radiate, that is, be detectable at a distance. It will be detectable unless we can control and confine it. Transmission lines confine the field by having equal but opposite voltages and currents on each wire in a two wire system in close enough proximity so that the fields cancel each other.

For a full account of the parameters of coaxial transmission lines, see *QEX*, August, 1996, pp. 3-10.

Now let's look at our lumped components: If they were large enough, they would have standing waves. They still have fields. If they did not, the grid-dip oscillator would not work. Of course, we try to control and confine component and interconnection-wire fields by a lot of methods. We confine inductor fields with iron or ferrite coil cores. We position components relative to each other for minimum coupling. We install shielding to keep inside fields from interacting with outside fields. Remember, however, that we can make use of component radiation. For example, we can make a large planar coil for the plate circuit of a tube and use it simultaneously as a lumped component in the circuit and as a loop antenna not especially less efficient than those used externally to the transmitter. (See, for example, *Communications Quarterly*, Winter, 1994, pp. 7-8.)

Since every capacitor exhibits some inductance and every inductor exhibits some capacitance (again, controlled to a minimum for predictable circuit use), every lumped component is a sibling of a transmission line. Just ask VHF designers who use transmission line components instead of inductors.

What about the other end of the transmission line: the antenna? Are they transmission lines? According to a traditional analysis, still very useful for low and very low frequencies, we can visually and mathematically picture an antenna as a transmission line spread apart so that the wires are collinear (end to end) rather than parallel. A lot of stuff happens if you do open up the transmission line in this way.

First, the fields around the wires are no longer confined by equal but opposite adjacent fields. Second, the intensity of the field and its phase may be just far enough away so that they add to the total field intensity in some directions and subtract from it in others.

In a transmission line, only enough power is consumed to overcome the losses of the wire system relative to establishing the fields of the standing wave. The remainder of the power supplied by the source is available at the other end of the line for the load. Of course, if we manage to unbalance the transmission line, it will act like an opened transmission line for that part of the voltage and current not in balance. In other words, it will act like an antenna.

The antenna is the transmission line's load in a transmitting situation because its fields are no longer confined. The current along the line yields fields that may spread without limit (with respect to the system). In short, the electrical energy is transformed into electro-magnetic radiation, and it must be resupplied from the source to maintain the ever-expanding fields.

On the receiving side, the antenna is always intercepting electro-magnetic fields, which set up currents in (or along) the antenna elements. The pattern of interception is the same as transmission, so that maximum current is generated from intercepted fields in the same direction as the maximum radiation of transmitted fields. The transmission line is in series with the currents, acting as the antenna's load and setting up equal but opposite polarity voltages and currents along its wires, voltages and currents that are amplified and processed by the receiver as radio frequency electrical energy..

Or, to put it another way, the opened transmission line converts currents to fields and fields to currents.

Antennas have capacitance and inductance, just as do transmission lines. More nearly correctly, antennas have capacitive and inductive reactance, from which we can calculate equivalent capacitances and inductances. Antennas of certain lengths show no reactance (we call them resonant), while antennas of other lengths show either an inductive or capacitive reactance at the feedpoint. We can cancel out the reactance with a lumped component having an equal amount of the opposite type of reactance. What is handy is that we can do the canceling right at the antenna terminals or remotely with an antenna tuning unit (ATU).

2001 MDARC Budget

By Trevor Hall, WA6JAU
To be voted on at the January MDARC General meeting

Operating Income

Membership Dues	$15,000
Interest	$300
Auction	$1400
Subtotal	$16,700
PACIFICON	$6,000
Total Income	$22,700

Operating Expenses

Minimum Operating Expenses

Carrier Printing approx $160/mo	$1,920
Carrier Postag	$780
Misc Membership Expense	$2,590
State Filing Fee	$20
Total Membership	$5,310

Repeater Operations

RRRC Chairmans Discretionary Fund	
Northgate and NARCC Dues	$270
Insurance, Equipment	$800
Telephone	$1200
Tower Lease	$5695
Consumables and Emergency Equipment	$1000
Office Supplies and postal	$ 250
Tower Climber	$1000
Subtotal	$10,215

Optional Repeater Operating Expenses
Capital Projects

Voter System	$2500

2.4 GHz ATV receiver/controller	$2000
Radio for DF use	$500
UPS	$200
Total Repeater Operations	$15,415

Miscellaneous

Field Day	$400
Telephone about $36/mo	$436
Speaker Gratuties	$150
Miscellaneos Subtotal	$986

Picnics and Parties Expenses

Picnic	$100
Holiday Award	$500
Holiday Decoration	$0
Holiday Prizes	$350
Holiday Food	$0
Picnics Subtotal	$950
Special Project Expenses	
Schools & Libraries	$35

Total Projected Income	**$22,700**
Total Expense	**$22,696**

Total Projected net $4

THANKS TO GREG ESTEP

Greg Estep has just completed his second year as president and he deserves our thanks for the many hours he has given to us. Being president is a job in itself but, in addition, he has always filled in the gaps. Before president he was Chair of PACIFICON but as president he continued as a very active member of the committee, not as an attendee but as a doer. While some of us would duck under the table when an out of control project surfaced he would take it on and solve it. At the same time as president he selflessly filled in for others. When someone failed to do something he gladly did it for him, an outstanding quality. His enthusiasm and dedication is greatly appreciated. We have been the beneficiaries.

Thanks to Greg for a great two years.

Dick, AA6DL

MDARC Board of Directors

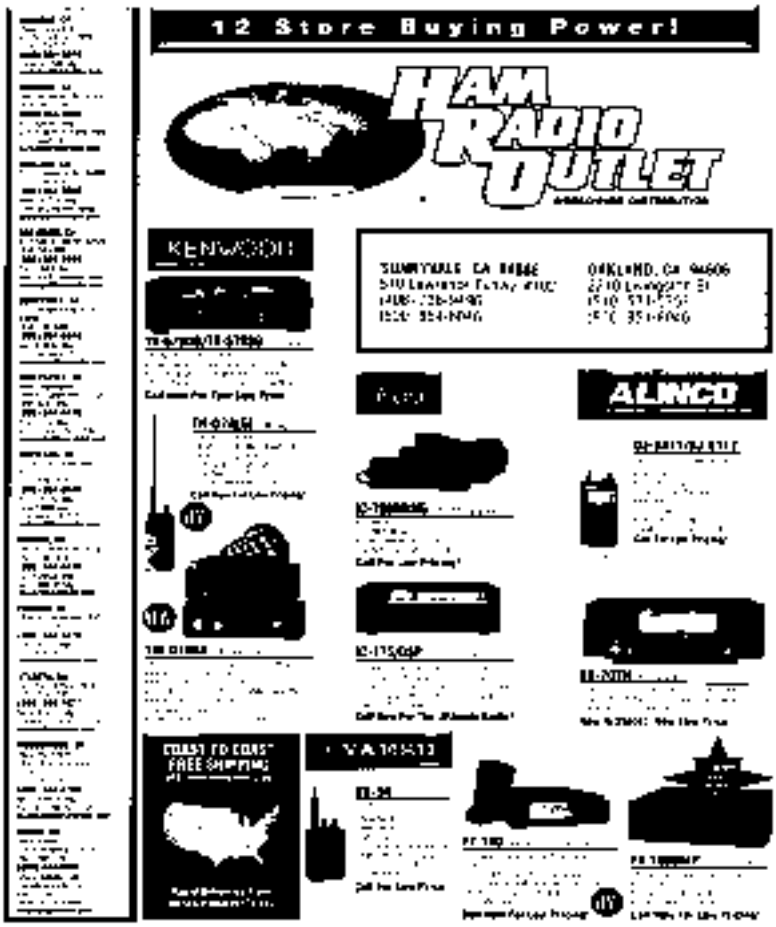
Position	Who		How to find them
President	Terry Matzkin	KE6WRE	925-820-5848 (h) myword@sprynet.com
Vice President	Dave Gordon	N6SWE	925-473-1031 (h) n6swe@earthlink.net
Secretary	Paul Dickey	N6JOX	925-376-3971 (h) paulr3@judydickey.com
Treasurer	Trevor Hall	WA6JAU	925-680-5209 (h) wa6jau@netzero.net
Emergency Coordinator	————	To be announced	————————————
Director at Large	Burk Howard	KE6PTT	925-798-7208 (h) ke6ptt@bigfoot.com
Director at Large	John Schulze	KR6CR	925-681-0552 (h) schulze2@ix.netcom.com
Director at Large	Mike Patterson	KE6JGA	925-944-8786 (h) mapa@ieee.org
Director at Large	Tracey Schwartz	KE6TOT	925-370-1917 (h) kurtps@earthlink.net

CHARTER MEMBER WINS GRAND PRIZE

Charter member, Chuck Patterson, K6RK, won the grand prize of a Yaesu 2m handheld at the MDARC Christmas party. One might think that a charter member of a fifty-four year old club is an old guy. That's only in the eye of the beholder. Yes, Chuck was thirty years old and had been a licensed ham for sixteen years when the club was formed. He also had a B.S. in Engineering from UC Berkeley, 1938, and an MBA from Stanford, 1940.

At age 84 Chuck is hard to keep up with. He is president of the Northern California DX club, and, of course, an avid DX'er. From his home in Lafayette, where he has lived since 1940, he worked over 320 countries. One of his current interests is 160m where he has worked over 100 countries. To further the 160m pursuit he has a home in Calavaras County with a 100' plus tower. He gets around with his two year old Mercedes. Having found his present car a little too sluggish he has ordered a 215 hp V6 Mercedes.

Dick, AA6DL



CALENDAR OF EVENTS

1/08/2001	7:30 PM	MDARC Board meeting	Emil Villa's in Concord
1/19/2001	7:30 PM	MDARC General meeting	
1/20/2001	8:00 AM	PACIFICON General meeting	
1/26/2001		Carrier Deadline	
1/31/2001		Deadline for renewals	
2/05/2001	7:30 PM	MDARC Board meeting	Emil Villa's in Concord
2/16/2001	7:30 PM	MDARC General meeting	
2/17/2001	8:00 AM	PACIFICON General meeting	
2/23/2001		Carrier Deadline	

MDARC Repeaters

147.060 MHz + / PL 100 Hz
224.780 MHz - / PL 77 Hz
441.325 MHz + / PL 100 Hz

ATV: Input 1253.250 MHz
ATV: Output 427.250 MHz Cable Channel 58
APRS: 144.39 MHz
TCP/IP: 145.71 MHz

The Carrier
Newsletter of the Mt. Diablo Amateur Radio Club
P.O. Box 23222
Pleasant Hill, CA 94523

Change in Service Requested